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C H Q

TECHNOCRACY

INC.

TO: Walt Fryers, 11353-A
11515 39 Ave.
Edmonton, Alta. T6J 0M5

October 11, 1984

SUBJECT: Term Paper

1. CHQ received the two copies of your term paper. We are sending one copy to TNT. If TNT wishes to enlist John Waring's assistance they can contact him directly.

2. In conjunction with the above, we are enclosing a copy of Howard Scott's paper: "A Thermodynamic Interpretation of Social Phenomena." This was in gray pamphlet form, but is now out of print. (You may have a copy in your file.) Also enclosed is a copy of "The Scientists Speak" which you may find informative. The portion we are sending you is only one of several papers comprising the book.

3. We are sure if TNT wants to use the article for the magazine they will request that you do additional work on it.

John T Spitler
John T. Spitler
Continental Director

JTS/skb
cc: TNT

ADDRESS: CONTINENTAL HEADQUARTERS, TECHNOCRACY INC., SAVANNAH, OHIO 44874

11515 39 Ave.,
Edmonton, Alta.
T6J 0M5

2 Oct 84

To: CHQ

Re: "A Thermometric Classification of the Technological Development of Society".

1. On a recent visit to the west coast (Vancouver, Ladysmith, Victoria, Sea ttle, et al) I mentioned this paper, prepared in April 1979, to several members and found some interest, especially by the Berge's of NW Technocrat.

of
2. The copy enclosed is/the original, complete with the professor's comments. It should be regarded as a preliminary treatment of the topic, prepared under the pressure of the academic term.

3. If it is considered suitable for development as a magazine article, it will require some research, development and re-write. Perhaps John Waring could provide an in-put in this instance.

4. I am sending a copy of the article to John Berge.

Walt Fryers.

Term Paper

A THERMOMETRIC CLASSIFICATION OF THE TECHNOLOGICAL DEVELOPMENT OF SOCIETY

Part 1 - The Pre-historic antecedents of power technology.

For:
Anthropology 330
April 1979

Prepared by:
Walter R. Fryers.

A THERMOMETRIC CLASSIFICATION OF THE TECHNOLOGICAL DEVELOPMENT OF SOCIETY

Introduction

Power technology - that is, the ability to convert significant amounts of extraneous energy to man's use - is generally dated from the development of the steam engine by Savery, Papin, Newcomen and Watt in the period between 1690 and the late 1700's. However, antecedent technologies upon which the development of power machinery depended extend back into pre-historic times, starting with the control and use of fire some million years ago. It is the purpose of this paper to examine these antecedents and to attempt to construct a time table and geneology of power technology from its beginnings. Due to limitations of time and reference material this must necessarily be a sketchy presentation.

But first, some discussion of the significance of this view of social development is in order.

Prior to the inception of power technology, man developed many technologies of fundamental importance to his life style and well-being, such as those for textiles, language, hand tools, shelters, agriculture, sailing ships, and so on. In various ways these technologies improved his productivity, his security, his mobility, his communication, his understanding, and other cultural dimensions. The motive power for all these activities was preponderantly man himself, including his slaves, with some contribution being made by his use of fire, animals, and the wind. Man himself was the chief energy converter for all the work to be done. Consuming, say, 3000 to 4000 Calories a day in food, and functioning at about 1/10th horsepower over a 10-hour day, man is a relatively inefficient energy converter at best, and without extraneous assistance, he must be

content to exist within the severe limitations of his physical capacities. As a consequence, man survived in close contact with the natural world and was therefore a natural product of his natural environment. The parameters of the natural world conditioned man's evolution, directly or indirectly, for the past several million years of his existence as a species.

The advent of power technology, however, has started man on a progression quite independent of many of the natural systems which moulded him previously. The increasing conversion of extraneous energy has imposed new environmental conditions which must inevitably be reflected in new evolutionary directions. And this process, barely 200 years underway, has just begun. Jacques Ellul, the French sociologist, focusses upon the pervasive influence of "The Technological Society" in his book of that title. He is alarmed. He sees man overwhelmed by his technology. He wants to turn back. And yet he does not specifically tie man's fate to the driving force of extraneous energy conversion. In the face of this most momentous of new circumstances in the human condition, he lapses into subjective reaction, unable to accept the course and prospects of the evolution of power technology.

If we accept the significance of power technology upon man's latter day fate, it is a matter of interest to examine the progression that brought him to this point.

In accomplishing this object, it is proposed to use two thermometric indices to define states of development in the use of extraneous energy.

The first of these is the maximum controlled temperature at man's disposal at any particular stage of development. This gives us an indication of the maximum limit of thermal-based technologies

at that time, though not necessarily of the degree of application and dispersal of these techniques.

The second index is the per capita energy conversion associated with a particular cultural environment. This could possibly provide some indication of the general application and dispersion of thermal-based technologies. This must be a rough estimate, as until recently, there have been no measurements to provide a data base. In recent years, the United Nations has compiled this kind of information for all, or most, of the countries of the world. Some inferences can be made from this source. Appendices I and II set out the data provided by the U.N. for 1967.

Capture and Subversion of Technologies

Before examining the progression of thermal-based technology in detail, attention is drawn to the great time gaps between the achievement of an advance in temperature control and its wider application and dispersion. This is due to a social phenomenon which we can term "capture" of the technology. For reasons of security, or prestige, or power, various elements of a society seek to control and confine new technologies to further the special interests of a particular group within a society. Archeology and history record many instances of the capture and subversion of a new technology to serve, for instance, purely artistic purposes for a leisure class of nobility or elite, rather than to serve broader applications for more commonly useful purposes. In other instances, capture was accomplished by the shaman or priestly class and enlisted in the service of magic. In more recent times - and to this day - the equivalent of "capture" is a prerogative of private enterprise and the military. The delay occasioned by "capture" was originally

measured in milleniums. In the accelerated progression of recent times, the delay is of the order of decades or years; sometimes only months.

This paper can offer little more than a cursory review of the most obvious steps in the pre-history sequence leading to power technology. Not only is the record necessarily incomplete for this early period, but references dealing with this aspect of the social progression have been difficult to find. The traditional pre-occupation of archeology with artistic rather than technological considerations seems to have resulted in notable omissions in the description of the thermometric progression.

Step 1 - Fire

The achievement by man of the techniques for the ignition and control of fire can hardly be over-emphasized. The American Peoples Encyclopedia, 1953, p.8-570, summarizes it well: "From the earliest ages man has been able to originate fire...The difficulty of starting the flame would, to the savage, be great, and consequently the desire of never allowing it to become extinguished gave rise to the maintaining of special fires under a professional class, which soon became the mysterious and sacred fires of the temples. Early methods of producing fire are based, in a variety of ways, on the application of friction, as in the rubbing together of two pieces of wood, or of concussion, as in the impact of flint and steel. One of the simplest frictional arrangements is what Hough calls the fire-plough, a pointed stick run along a groove in a piece of wood lying on the ground. Many improvements upon this method have been found--e.g., the bow drill of the Eskimo, and the pump drill of the Iroquois Indians. Human culture may be said to have begun with fire, of which the uses

increased in the same ratio as culture itself. From the primitive beginnings of the camp fire have evolved the majority of the arts that have supplied man's artificial wants--those primary arts represented by lighting, cooking, offense and defense, and those secondary arts connected with the mechanics of fire or its use in agriculture, timbering, shipbuilding, metallurgy, ceramics, etc."

Wood was almost the universal fuel until the 17th century. But wood itself varies greatly in its thermal capacity. Primitive man would be well aware of this and would, no doubt, develop considerable expertise in the selection, drying, storing and using various kinds of available woods, for a variety of purposes. Rated by modern methods, pine wood provides about 8000 BTU per pound; cherry, oak, poplar, birch, in declining order, 300 to 500 units less. A simple camp fire, fuelled by wood, can achieve temperatures of only 1100 to 1300°F (600 to 700°C). At this temperature, simple baked clay forms can be made, but not true ceramics, much less any metallurgical operation.

So important was fire and its preservation to early man, it is interesting to speculate that perhaps the earliest 'temples' were in essence 'woodsheds' and keepers of the flame.

Step 2 - Charcoal

Charcoal is a much superior fuel to wood from which it is derived. It is rated, I am informed, at some 14,000 BTU per pound; almost double the rating for wood. Accordingly it provides a much hotter flame and is in use for smelting to this day. The point at which primitive man realized the virtues of charcoal; prepared it and used it for the processing of mineral resources, is obscure.

By definition, charcoal "is the carbonaceous material obtained by the imperfect combustion or destructive distillation of wood or

other organic substances." An appreciation of the importance of this material is conveyed by the following quote from the American Peoples Encyclopedia, 1953, p.5-138: "In the ancient art of charcoal burning, cut wood was stacked in conical piles, covered with earth except for the air openings necessary for controlled combustion, and burned to a char...Before the beginnings of coke manufacture from coal late in the 17th centry and long thereafter charcoal was the chief fuel used in the reduction of iron ores, and even in modern iron and steel metallurgy it (is used as) blast furnace fuel for producing iron and steel of exceptionally high quality."

no time depth given ?

Step 3 - Ceramics

The smelting of ores had to await the development of suitable containment vessels to withstand the high temperatures of the charcoal fire and the molten metal. These refractory materials would be found in the course of the evolution of ceramic technology.

In a more general sense, ceramic technology is really 'clay' technology. To quote from Scientific American of April 1979 in its article on 'Clay', p.116: "No material extracted from the earth is put to a wider variety of uses than clay, and no material except flint has been used longer. For 10,000 years people have found applications for clay, and new uses appear every year. Indeed, clay can be described as one of the world's principal ores. The most numerous applications are in ceramics. The value of clay in this respect arises from its plasticity and the fact that it becomes hard when it is fired. Hence it can be shaped easily, and then after firing the shape is permanent and the object has become both mechanically and thermally resistant. At first ceramic objects were made of illite-rich earth, because the temperatures required for firing were low. In time (sooner in the Orient than elsewhere) people learned how to find more refractory earths to build furnaces, so that the firing temperatures could be increased. The result was stoneware, which is made by firing clay at a temperature high enough to make the object partly melt and so become impermeable. Wall tiles, ceramic pipes and stone pots are among the objects made in this way. When one works with kaolinite at even higher temperatures, one obtains domestic and sanitary faiences. When the kaolinite is quite pure and melting is complete, a translucent glass is obtained: this is porcelain."

A plausible sequence in the evolution of ceramic technology is described by Hodges in his "Technology in the Ancient World", p.31: "before 6000 B.C. in Anatolia at least, a simple moulding device had been invented...The people who made their houses of mud-brick did not use the material solely for this purpose, for the walls of their buildings were normally plastered with a layer of mud while the floor was made of a carefully laid layer of clay. In its plastic state, clay was also used for the modelling of such things as small figures and toy animals. It was also discovered during this period that, when dry, the material could be hardened by firing, and the production of pottery is often taken to be one of the more remarkable inventions made by man during this epoch." And further, on p.37: "The discovery that clay vessels could be fired to produce the more durable pottery also belongs to this period. Methods of manufacture were simple, requiring no specialized pieces of equipment. The clay was mixed with sand or crushed rock and shaped by hand"...Pottery was fired either in the domestic hearth or in special bonfires."

The endless experimentation by early man to improve pottery by hotter fires may well have led to the use of charcoal, plus fanning or blowing, within the confines of a closed crude furnace or kiln. Clay tuyeres (blowpipes) and eventually bellows were developed over the centuries. The combination of the enclosed furnace with refractory lining, plus charcoal fuel and forced air by blow pipes made temperatures of 3000°F (1660°C) attainable, sufficient to melt iron.

Step 4 - Smelting of ores and the casting of metals

The earliest metal object yet found is a copper pendant from Shanidar cave in Iran, dating from 9500 B.C. However it was made from raw native copper, not from smelted ore. By 6000 B.C. the copper age was well established but limited to hammering and annealing techniques applied to native copper. Annealing can be accomplished at campfire temperatures, say 800°C.

Smelting of copper ores dates from 4000 B.C., indicating temperatures of 1100°C, were achievable. The development of the furnace, with charcoal fuel, must have pre-dated this stage, however crude. The incorporation of impurities such as tin or arsenic in the copper, whether by accident or design, led to the bronze stage of metallurgy, by 3000 B.C. All these developments are traceable to Near East origins.

Smelting of iron ores dates from 3000 B.C., based on the finding of various iron objects from that epoch, as described in Chapter IV of the Time-Life Series publication "The Metalsmiths".

The further step of up-grading iron to steel did not take place until about 500 B.C. The Hallstat people in Britain were able to produce a primitive type of 'steel' at this time by the technique of 'carburizing' iron. By 100 B.C. British blacksmiths were using this to make hoops for barrels and tires for chariot wheels.

Step 5 - The Steam Engine

Although pre-historic technology attained the remarkable capability of smelting iron, the exploitation of this skill was a very slow process. It was not until the 1600's and 1700's that metal technology was put to use in developing the early steam engines. The reasons for this time-gap are probably complex, but it is obvious that preference for precious metals and the emphasis on the arts of war did little for the development of iron technology, and consequently for progress toward power technology.

Thermometric Timetable (Using Index I - Maximum Controlled Temp.)

Within the scope of this paper and the data available, it has not been possible to construct a detailed thermometric timetable of the development of elements of power technology in the pre-historic period. However the sketchy details so far assembled are plotted on Chart I. The time scale ranges from 1 million years ago to the year 2000 A.D. The temperature scale ranges from 100°C to 1 million degrees Centigrade (Celsius). To accommodate these limits it was necessary to use Log/Log graph paper. This permits points to be plotted from the first use of fire to the latest achievement of fusion technology. More intermediate points than those shown would improve the chart.

Thermometric Timetable (Using Index II - Per Capita Energy Conversion).

An explanation of the early involvement of man with energy and energy conversion is briefly and clearly set down in the Technocracy Study Course, 1934, p. 79, 80: "Before man learned to use fire, his sole available source of energy was that contained in the food he ate. This,...for an average population of

young and old, amounts to about 2,300 kilogram-calories per person per day.....Extraneous energy--energy other than food eaten--was... introduced but very gradually. First, there was fire. This was the utilization of the heat contained in wood. Then there was the work of animals, the horse, the ox, the dog. At no time throughout early history was the number of domestic animals per capita very large on an average. Then came the use of the energy of the wind and running water, but these were only used locally, and were never (during this period) of great importance.....Estimating on the average the use of fuel to provide approximately 400 kilogram-calories per capita per day (average for all climates), and one domestic animal for every five people, providing an additional 1,600 kilogram-calories per person per day, we would arrive at a total of extraneous energy of only about 2,000 kilogram-calories per capita per day prior to the extensive use of fossil fuels.....Thus we see that, great as were the strides made by the human race through the preceding history, the increase of the average standard of living, stated in the physical terms of energy-consumption, was almost negligible."

To indicate the range of Index II (Per Capita Energy Conversion), including historic times, reference is made to the United Nations Year Book for 1971. Table 137 gives the per capita energy consumption for virtually all countries of the world for 1967. (See Appendices I and II to this paper for an abstract of the tabulation.) Inasmuch as various countries and regions still exemplify almost every stage of human culture from the stone age to the present, the figures provide an approximate thermometric index of industrial development as gauged by extraneous energy conversion, domestic animals excluded. The U.N. figures are given in kilogrammes of coal equivalent, per capita/ per year. These can be readily converted to kilogram~~s~~-calories, per day.

The most 'primitive' countries or stages are represented by Rwanda at 8 kgm (175 kg.cal.); Upper Volta at 10 kgm (219 kg.cal.); Somalia at 42 kgm (920 kg.cal.); Yeman at 9 kgm (197 kg.cal.); and Nepal also at 9 kgm (197 kg.cal.).

The more advanced countries can be represented by the United States at 9880 kgm (216,548 kg.cal.).

The data given above in this section have not been tabulated or graphed. Most of the significant changes have occurred in historic times and would be better dealt with in later parts of this study.

Conclusion

It has not been possible in the scope of this paper to analyze individual cultures and particular technologies. The indices have been used in the broadest possible sense to indicate major stages in the progression toward power technology. The same approach could be used to advantage in explaining extra-ordinary cultural achievements. For instance it would then be necessary to classify slaves as, basically, energy converters in the same class as domestic animals, which indeed they were. To quote again from the Technocracy Study Course, 1934, p.80: "During the 'golden age' of Athens only a relatively small part of the population was free. The preponderance of the people were slaves or serfs of some degree or other. History, as it has been handed down, has focused attention upon a few of the more illustrious of these free citizens; the others whose toil made this freedom of the few possible have been more or less tactfully omitted. Under the glory that was Rome, one finds a similar or worse condition. At the height of the power of the Roman Empire most of the necessary work that was required, such as building, agriculture, and mining, was done by slaves." And similarly with the pyramids of Egypt and innumerable other celebrated achievements of man's 'civilization'.

which were not 'freed' until the invention steam engine & thus availability of a new 'slave'?

It can be argued, and has been, that civilization has been advanced principally by the demands and leadership of special classes such as the nobility, the priests, the leisured elite, the artists. Thus in the introduction to "The Metalsmiths" Cyril Stanley Smith is quoted as stating that "the discovery of something new requires the sensitivity and curiosity of the artist" and further: "metals appeared because millenia ago someone's artistic sensibilities were piqued by an interesting and pretty stone" and that "the new ways of working with metals almost always involved the decorative arts first". While this may be partially true, the broad panorama of man's progress in handling matter and energy must, I think, be attributed to the craftsman, the common man, who perpetually strives by experiment to turn all available resources to his everyday use.

The culmination of the long progression in the conversion of energy to man's use is even now in sight. When a society of continental dimension, such as North America, achieves or exceeds an energy conversion level of 200,000 kilogram-calories per capita per

day, Technocracy contends it will, of necessity, abandon the cultural patterns of scarcity and hand-toil and proceed to the construction of a society of abundance and security for all its citizens. In North America, that day is almost to hand, it is claimed.

- - - - - - - -

Walter R. Fryers.

A very interesting paper. I would have liked to see calculations for the various 'stages' of cultural development.

8/10

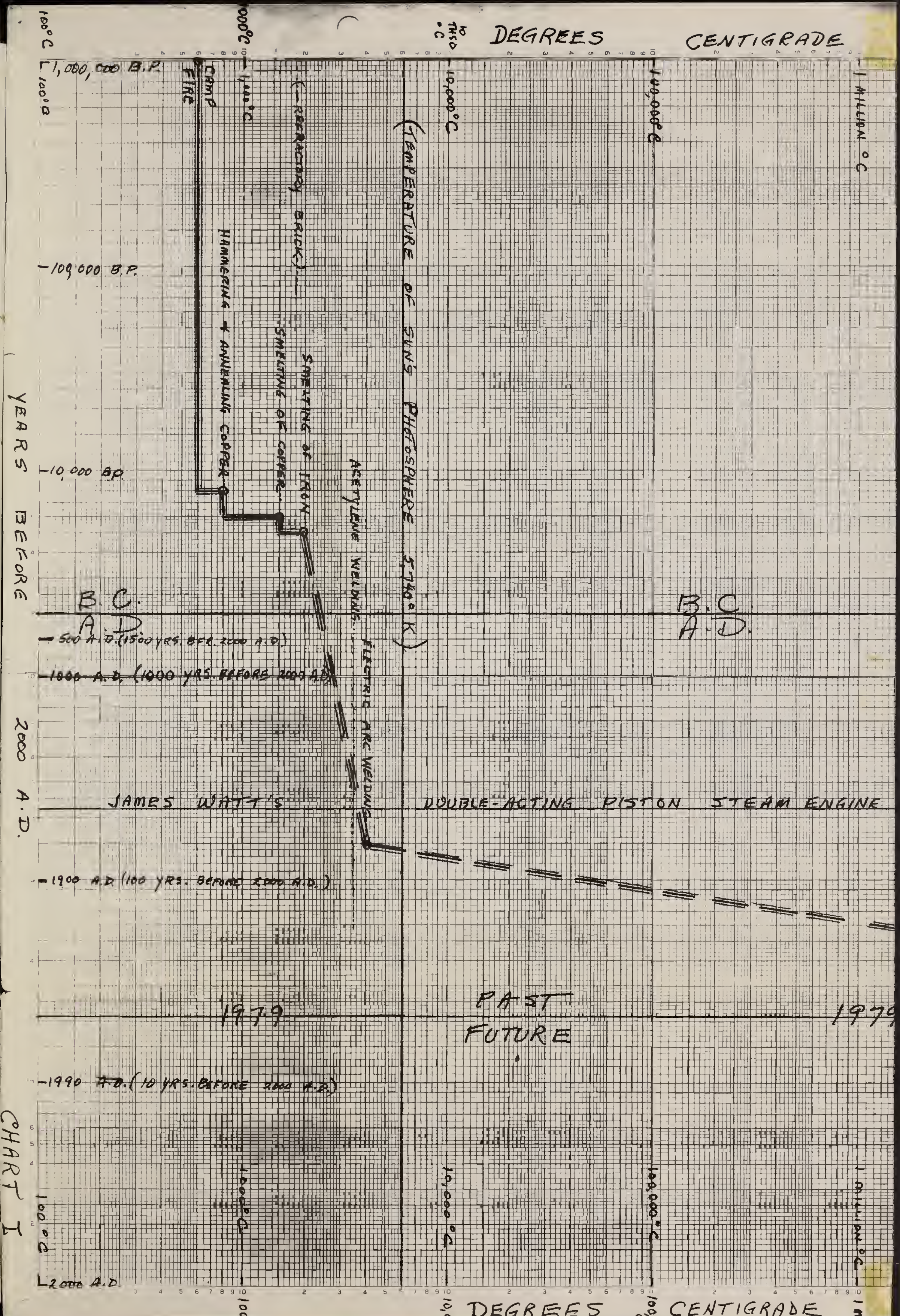
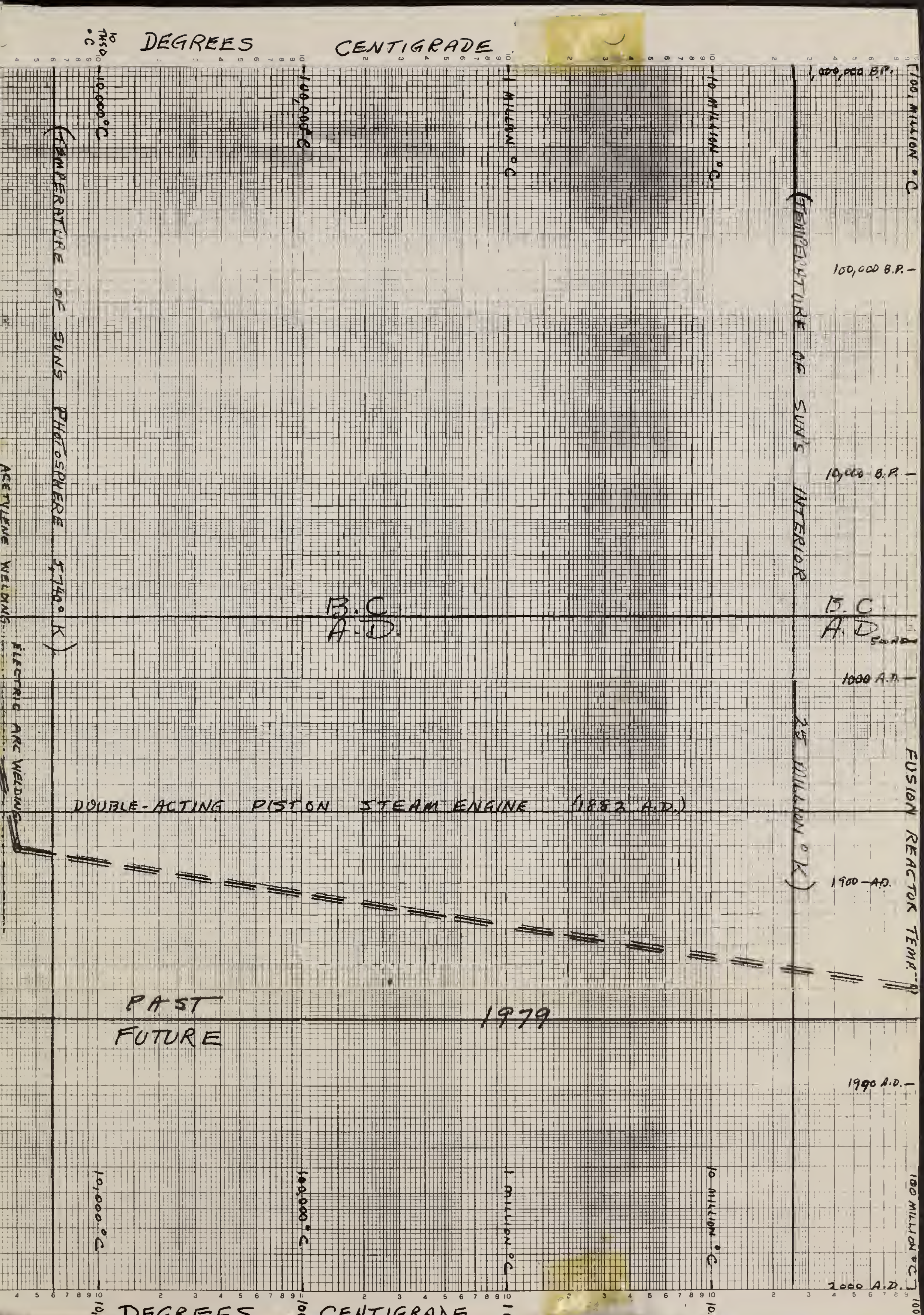

DEGREES CENTIGRADE
100°C
1000°C
10 THSD °C
1,000,000 B.P.
100°C
CAMP FIRE
1,000°C
(←REFRACTORY BRICK)
10,000°C
(TEMPERATURE OF SUN'S PHOTOSPHERE 5,740° K)
100,000°C
1 MILLION °C
100,000 B.P.
HAMMERING + ANNEALING COPPER
SMELTING OF COPPER
SMELTING OF IRON
10,000 B.P.
ACETYLENE WELDING
ELECTRIC ARC WELDING
B.C.
A.D.
500 A.D. (1500 YRS. BFR. 2000 A.D.)
1000 A.D. (1000 YRS. BEFORE 2000 A.D.)
JAMES WATT'S DOUBLE-ACTING PISTON STEAM ENGINE
1900 A.D. (100 YRS. BEFORE 2000 A.D.)
1979
PAST
FUTURE
1979
1990 A.D. (10 YRS. BEFORE 2000 A.D.)
100°C
1000°C
10,000°C
100,000°C
1 MILLION °C
2000 A.D.
1000
10,000
DEGREES
100,000 C
CENTIGRADE
1 MILL
YEARS BEFORE 2000 A.D.

CHART I


DEGREES CENTIGRADE
10 THSD °C
10,000°C
100,000°C
1 MILLION °C
10 MILLION °C
100 MILLION °C
1,000,000 B.P.
100,000 B.P.
10,000 B.P.
B.C.
A.D.
500 A.D.
1000 A.D.
1900 A.D.
1990 A.D.
2000 A.D.
(TEMPERATURE OF SUN'S PHOTOSPHERE 5,740° K)
(TEMPERATURE OF SUN'S INTERIOR 25 MILLION ° K)
ACETYLENE WELDING
ELECTRIC ARC WELDING
DOUBLE-ACTING PISTON STEAM ENGINE (1882 A.D.)
FUSION REACTOR TEMP.
PAST
FUTURE
1979
10,000°C
100,000°C
1 MILLION °C
10 MILLION °C
100 MILLION °C
DEGREES CENTIGRADE

Appendix I

ENERGY (Abstracted from United Nations Statistical Yearbook, 1971.)

137. Energy: production and consumption[1] — Energie: production et consommation[1]

Quantities in million metric tons of coal equivalent and in kilogrammes per capita.
Quantités en millions de tonnes métriques, équivalent en houille et en kilogrammes par habitant.

Consumption — Consommation	
Region and country Région et pays	Per capita Par habitant 1967
WORLD — MONDE	1 644
AFRICA — AFRIQUE	290
Algeria — Algérie	386
Angola	99
Burundi	7
Cameroon — Cameroun	76
Cape Verde Islands — Iles du Cap-Vert	100
Central African Republic République centrafricaine	34
Chad — Tchad	16
Comoro Islands — Comoras	35
Congo, People's Rep. Congo, Rép. populaire	184
Dahomey	27
Egypt [4] — Egypte [4]	265
Equatorial Guinea — Guinée équatoriale	157
Ethiopia — Ethiopie	22
Fr. Territory of the Afars and the Issas Terr. français des Afars et des Issas	779
Gabon	406
Gambia — Gambie	48
Ghana	107
Guinea — Guinée	97
Ivory Coast — Côte d'Ivoire	156
Kenya	140
Liberia — Libéria	286
Libyan Arab Rep. — Rép. arabe libyenne	476
Madagascar	58
Malawi	39
Mali	24
Mauritania — Mauritanie	39
Mauritius — Maurice	181
Morocco — Maroc	178
Mozambique	104
Niger	15
Nigeria — Nigéria	37
Port. Guinea — Guinée port.	56
Réunion	251
Rwanda	8
São Tomé and Principe São Tomé et Principe	102
Senegal — Sénégal	145
Seychelles	183
Sierra Leone	41
Somalia — Somalie	42
South Africa — Afrique du Sud	2 680
Southern Rhodesia — Rhodésie du Sud	472
Sudan — Soudan	103
Togo	56
Tunisia — Tunisie	220
Uganda — Ouganda	52
United Rep. of Tanzania A [2]	71
Rép.-Unie de Tanzanie B [3]	46
Upper Volta — Haute-Volta	10
Zaire [5] — Zaire [5]	66
Zambia — Zambie	577

Consumption — Consommation	
Region and country Région et pays	Per capita Par habitant 1967
AMERICA, NORTH — AMERIQUE DU NORD	9 708
Bermuda — Bermudes	2 950
Canada	8 061
Greenland — Groenland	4 209
St. Pierre, Miquelon	4 599
United States — Etats-Unis	9 880
AMERICA, CENTRAL — AMERIQUE CENTRALE	1 017
Bahamas	4 561
Barbados — Barbade	463
Br. Honduras — Honduras br.	469
Canal Zone — Zone du Canal	4 697
Colombia — Colombie	570
Costa Rica	291
Cuba	1 064
Dominican Rep. — Rép. Dominicaine	181
El Salvador	170
Guadeloupe	414
Guatemala	218
Haiti — Haïti	31
Honduras	174
Jamaica — Jamaïque	997
Leeward Is. — Iles Leeward	1 031
Martinique	438
Mexico — Mexique	1 096
Neth. Antilles — Antilles néerl.	..
Nicaragua	290
Panama	1 248
Puerto Rico — Porto Rico	2 387
Trinidad — Trinité, Tobago	4 215
Venezuela	2 245
Virgin Is. [US] — I. Vierges [E-U]	..
Windward Islands — Iles Windward	155
AMERICA, SOUTH — AMERIQUE DU SUD	613
Argentina — Argentine	1 451
Bolivia — Bolivie	191
Brazil — Brésil	388
Chile — Chili	1 113
Ecuador — Equateur	223
Falkland Islands — Iles Falkland	6 000
French Guiana — Guyane française	787
Guyana — Guyane	926
Paraguay	138
Peru — Pérou	606
Surinam	1 936
Uruguay	836

See general note to Table 12.

[1] For production of coal, lignite, natural gas and crude petroleum by countries, see "Mining and Quarrying"; for production of petroleum products and coke, see "Manufacturing"; for production of electricity, see Table 139.

[2] A. Former Tanganyika.

[3] B. Former Zanzibar and Pemba.

[4] Formerly listed as "United Arab Republic".

[5] Formerly listed as "Congo, Democratic Republic of".

Appendix II

ENERGY (Abstracted from United Nations Statistical Yearbook, 1971)

137. Energy: production and consumption (continued) — Energie: production et consommation (suite)

Quantities in million metric tons of coal equivalent and in kilogrammes per capita.
Quantités en millions de tonnes métriques, équivalent en houille et en kilogrammes par habitant.

	Consumption — Consommation
	Per capita Par habitant
Region and country Région et pays	1967
ASIAN MIDDLE EAST MOYEN-ORIENT D'ASIE	542
Bahrain — Bahrein	3 356
Cyprus — Chypre	1 051
Iran	451
Iraq — Irak	558
Israel — Israël	2 279
Jordan — Jordanie	275
Kuwait — Koweit	10 878
Lebanon — Liban	630
Neutral Zone [2] — Zone neutre [2]	..
Oman [5]	29
Qatar	1 314
Saudi Arabia — Arabie Saoudite	463
Syrian Arab Rep. — Rép. arabe syrienne	384
Trucial Oman [1] Oman sous régime de traité [1]	705
Turkey — Turquie	422
Yemen — Yémen	9
Yemen, People's D.R. — Yémen, R.d. populaire	139
ASIA, EXCEPT MIDDLE EAST [3] ASIE A L'EXCLUSION DU MOYEN-ORIENT [3]	376
Afghanistan	36
Brunei — Brunéi	2 303
Burma — Birmanie	52
Ceylon — Ceylan	111
China [7] — Chine [7]	724
Hong Kong — Hong-kong	789
India — Inde	180
Indonesia — Indonésie	96
West Irian — Irian occidental	58
Japan — Japon	2 253
Khmer Rep. [6] — Rép. khmère [6]	51
Korea, Rep. of — Corée, Rép. de	570
Laos	54
Macau — Macao	294
Malaysia — Malaisie:	
East — Orientale:	
Sabah	274
Sarawak	430
West — Occidentale	427
Nepal — Népal	9
Pakistan	79
Philippines	229
Ryukyu Islands — Iles Ryû-kyû	515
Singapore — Singapour	638
Thailand — Thaïlande	173
Viet-Nam, Rep. of — Viet-Nam, Rép. du	286
EUROPE, EXCEPT EASTERN EUROPE EUROPE, A L'EXCLUSION L'EUROPE ORIENT.	3 140
Austria — Autriche	2 658
Belgium — Belgique, Luxembourg	4 671
Denmark — Danemark	4 270
Faeroe Islands — Iles Féroé	2 325
Finland — Finlande	2 984
France	3 163
Germany, Fed. R. — Allemagne, R. féd.	4 171
Gibraltar	1 439
Greece — Grèce	887
Iceland — Islande	3 821
Ireland [1] — Irlande [1]	2 617
Italy — Italie	2 177
Malta — Malte	783
Netherlands — Pays-Bas	3 746
Norway — Norvège	3 970
Portugal	544
Spain [2] — Espagne [2]	1 244
Sweden — Suède	4 832
Switzerland — Suisse	2 756
United Kingdom — Royaume-Uni	4 893
Yugoslavia — Yougoslavie	1 171
OCEANIA — OCEANIE	3 633
American Samoa — Samoa américain	3 879
Australia — Australie	4 845
Br. Solomon Is. — Iles Solomon br.	109
Christmas Island — Ile Christmas	7 000
Fiji — Fidji	337
Fr. Polynesia — Polynésie fr.	1 006
Gilbert, Ellice Is. — Iles Gilbert, Ellice	218
Guam	1 141
Nauru	4 000
New Caledonia — N.-Calédonie	7 208
New Guinea — N.-Guinée	89
New Hebrides — Nouvelles-Hébrides	483
New Zealand — Nouvelle-Zélande	2 562
Pacific Is — Iles du Pacifique	268
Papua	124
Wake Island — Ile de Wake	..
Western Samoa — Samoa-Occidental	95
CENTRALLY PLANNED ECONOMIES PAYS A ECONOMIE PLANIFIEE	1 450
Albania — Albanie	477
Bulgaria — Bulgarie	3 053
Czechoslovakia — Tchécoslovaquie	5 489
German Dem. Rep. — Rép. dém. allemande	5 349
Hungary — Hongrie	2 673
Poland — Pologne	3 652
Romania — Roumanie	2 280
USSR [1] — URSS [1]	3 949
Asia, n.e.s. [3] — Asie, n.a.c. [3]	350

See general note to Table 12.

[1] 1966–1968: Abu Dhabi, only; beginning 1969, includes Abu Dhabi and Dubai.
[2] Jointly shared by Saudi Arabia and Kuwait.
[3] Excluding China (except Taiwan), Democratic People's Republic of Korea, Mongolia and Democratic Republic of Viet-Nam.
[4] Including estimates of crude petroleum production in the occupied Sinai Peninsula.
[5] Formerly listed as "Muscat and Oman".
[6] Formerly listed as "Cambodia".
[7] Data for Taiwan only.

12. Energy: production, trade and consumption (continued)

World and regions

Quantities: million metric tons of coal equivalent. Per capita: kilograms

World and regions	Year Année	CONSUMPTION — CONSOMMATION Total energy Energie totale Aggregate Ensemble	Per capita Par habitant	World and regions	Year Année	Total energy Energie totale Aggregate Ensemble	Per capita Par habitant
WORLD [2]	1970	6 782	1 881	ASIAN MIDDLE EAST	1970	81	776
	1971	7 051	1 920		1971	88	821
	1972	7 391	1 977		1972	97	875
	1973	7 767	2 041		1973	111	977
	1974	7 816	2 017		1974	122	1 049
	1975	7 877	1 996		1975	132	1 101
	1976	8 318	2 069		1976	144	1 169
AFRICA	1970	109	309	ASIA, EXCEPT MIDDLE EAST	1970	546	492
	1971	121	334		1971	576	508
	1972	128	344		1972	603	521
	1973	134	353		1973	667	564
	1974	142	364		1974	670	554
	1975	151	376		1975	672	544
	1976	164	397		1976	704	557
AMERICA, NORTH	1970	2 445	10 852	EUROPE, EXCEPT EASTERN EUROPE	1970	1 368	3 862
	1971	2 489	10 880		1971	1 399	3 925
	1972	2 637	11 424		1972	1 455	4 051
	1973	2 683	11 534		1973	1 547	4 281
	1974	2 621	11 176		1974	1 520	4 181
	1975	2 578	10 900		1975	1 471	4 025
	1976	2 716	11 395		1976	1 573	4 289
AMERICA, CENTRAL	1970	138	1 126	OCEANIA	1970	78	4 031
	1971	145	1 148		1971	82	4 144
	1972	153	1 183		1972	86	4 272
	1973	168	1 259		1973	92	4 524
	1974	175	1 277		1974	98	4 739
	1975	175	1 234		1975	99	4 684
	1976	185	1 265		1976	106	4 953
AMERICA, SOUTH	1970	110	702	CENTRALLY PLANNED ECONOMIES [1]	1970	1 907	1 641
	1971	119	742		1971	2 032	1 724
	1972	126	767		1972	2 107	1 761
	1973	137	815		1973	2 227	1 838
	1974	145	840		1974	2 322	1 889
	1975	149	837		1975	2 452	1 965
	1976	158	868		1976	2 570	2 030

Note. Production data are based on the production of coal, lignite, crude petroleum, natural gas, natural gas liquids and hydro and nuclear electricity; where peat used as fuel is important, it is included with coal and lignite. Consumption: data are based on the apparent consumption of coal, lignite, petroleum products, natural gas and hydro and nuclear electricity. Coke, manufactured gas and electricity internationally traded are considered to have been consumed by the importing country. Bunkers supplied to foreign-going ships are excluded from consumption. Where suitable official data were not available, estimates were made by the Statistical Office. Comparison between coal and other sources of energy is based on calorific value; factors for conversion to coal equivalent appear in the appendix.

[1] Eastern Europe, China, Mongolia, Democratic People's Republic of Korea, Viet Nam and USSR.

This table contains no new information from that published in the 1977 Statistical Yearbook. For additional detail see *World Energy Supplies 1973–1978*, Statistical Office of the United Nations. Statistical Papers, Series J. No 22, Individual countries included under the various regions are shown in Table 142.

[1] For production of coal, lignite, natural gas, natural gas liquids and crude petroleum by countries, see "Mining and Quarrying"; for production of petroleum products and coke, see "Manufacturing"; for production of electricity, see Table 144.

[2] Unrevised data for the years 1950–1969 are available in Statistical Papers, Series J, No. 20.

12. Energy: ~~[illegible]~~ consumption[1]

World and regions

Quantities: million metric tons of coal equivalent, Per capita: kilogrammes

World and region	Year Année	CONSUMPTION — CONSOMMATION Total energy Energie totale Aggregate Ensemble	CONSUMPTION — CONSOMMATION Total energy Energie totale Per capita Par habitant
WORLD[2]	1953	2 867	1 109
	1958	3 711	1 286
	1963	4 713	1 490
	1965	5 220	1 583
	1966	5 515	1 640
	1967	5 616	1 644
	1968	6 023	1 727
	1969	6 416	1 805
	1970	6 843	1 889
AFRICA	1953	49	186
	1958	64	250
	1963	76	256
	1965	88	283
	1966	93	288
	1967	94	284
	1968	99	294
	1969	102	294
	1970	109	312
AMERICA, NORTH	1953	1 295	7 420
	1958	1 424	7 412
	1963	1 751	8 403
	1965	1 940	9 053
	1966	2 053	9 460
	1967	2 128	9 686
	1968	2 257	10 164
	1969	2 376	10 586
	1970	2 477	10 944
AMERICA, CENTRAL	1953	40	549
	1958	67	796
	1963	91	911
	1965	100	944
	1966	107	972
	1967	115	1 017
	1968	126	1 078
	1969	129	1 075
	1970	137	1 119
AMERICA, SOUTH	1953	39	384
	1958	55	478
	1963	73	555
	1965	80	578
	1966	86	602
	1967	90	613
	1968	99	650
	1969	108	691
	1970	112	706
ASIAN MIDDLE EAST	1953	14	311
	1958	23	318
	1963	37	439
	1965	44	481
	1966	48	512
	1967	52	542
	1968	57	578
	1969	64	634
	1970	81	775
ASIA, EXCEPT MIDDLE EAST	1953	128	170
	1958	170	202
	1963	281	293
	1965	324	321
	1966	353	340
	1967	393	376
	1968	436	401
	1969	486	436
	1970	540	480
EUROPE, EXCEPT EASTERN EUROPE	1953	638	2 072
	1958	763	2 385
	1963	977	2 904
	1965	1 045	3 050
	1966	1 080	3 123
	1967	1 094	3 140
	1968	1 161	3 314
	1969	1 246	3 525
	1970	1 348	3 784
OCEANIA	1953	32	2 358
	1958	41	2 777
	1963	51	3 071
	1965	60	3 469
	1966	63	3 525
	1967	66	3 633
	1968	70	3 784
	1969	73	3 878
	1970	77	4 031
CENTRALLY PLANNED ECONOMIES[1]	1953	631	710
	1958	1 104	1 106
	1963	1 376	1 329
	1965	1 538	1 444
	1966	1 633	1 513
	1967	1 585	1 450
	1968	1 719	1 552
	1969	1 832	1 634
	1970	1 961	1 693

Note. Production data are based on the production of coal, lignite, crude petroleum, natural gas and hydro and nuclear electricity; where peat used as fuel is important, it is included with coal and lignite. Consumption: data are based on the apparent consumption of coal, lignite, petroleum products, natural gas and hydro and nuclear electricity. Coke, manufactured gas and electricity internationally traded are considered to have been consumed by the importing country. Bunkers supplied to foreign-going ships are excluded from consumption. Where suitable official data were not available, estimates were made by the Statistical Office. Comparison between coal and other sources of energy is based on calorific value; factors for conversion to coal equivalent appear in the Appendix. For additional detail see *World Energy Supplies* 1967–1970, Statistical Office of the United Nations, Statistical Papers, Series J. No. 15, Individual countries included under the various regions are shown in Table 137.

[1] For production of coal, lignite, natural gas and crude petroleum by countries, see "Mining and Quarrying"; for production of petroleum products and coke, see "Manufacturing"; for production of electricity, see Table 139.

[2] Unrevised data for the years 1929, 1937, 1949–1952, 1954–1957, 1959–1962 are available in preceding issues of the *Statistical Yearbook*.

VERA

Department of International Economic and Social Affairs
Statistical Office

Département des affaires économiques et sociales internationales
Bureau de statistique

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UNITED NATIONS • NATIONS UNIES

New York, 1979

12. Energy: production, trade and consumption[1]

World and regions

Quantities: million metric tons of coal equivalent. Per capita: kilograms

World and regions	Year Année	PRODUCTION OF PRIMARY COMMERCIAL ENERGY / PRODUCTION DE L'ENERGIE PRIMAIRE COMMERCIALE					NET IMPORTS IMPORTATIONS NETTES	BUNKERS COMBUSTIBLES DE SOUTE
		Total primary energy Energie primaire totale	Coal and lignite Houille et lignite	Crude pet. and nat. gas liquids Pétrole brut et cond. prov. du gaz nat.	Natural gas Gaz naturel	Hydro and nuclear electricity Electricité (hydro et nucléaire)	Total energy Energie totale	
WORLD[2]	1970	7 350	2 399	3 473	1 323	154	−15	230
	1971	7 656	2 395	3 681	1 415	165	−16	237
	1972	7 980	2 426	3 888	1 489	177	−11	249
	1973	8 448	2 470	4 239	1 550	185	−13	264
	1974	8 537	2 503	4 251	1 576	207	−49	252
	1975	8 482	2 633	4 043	1 585	222	10	233
	1976	8 951	2 702	4 359	1 662	228	−32	227
AFRICA	1970	501	60	434	4	3	−373	12
	1971	481	64	409	5	3	−335	12
	1972	487	64	409	11	4	−342	12
	1973	511	68	427	11	4	−356	12
	1974	482	70	394	13	4	−318	11
	1975	461	75	367	15	5	−287	10
	1976	537	81	429	21	5	−347	9
AMERICA, NORTH	1970	2 367	567	895	852	53	198	29
	1971	2 352	522	891	882	58	242	28
	1972	2 427	560	911	892	64	294	28
	1973	2 432	556	911	894	70	385	32
	1974	2 361	567	868	847	79	380	31
	1975	2 314	610	817	803	85	388	30
	1976	2 308	622	789	810	87	497	33
AMERICA, CENTRAL	1970	396	5	351	36	4	−215	24
	1971	380	6	338	33	4	−189	24
	1972	359	6	314	34	4	−170	23
	1973	379	7	329	38	4	−158	25
	1974	362	8	310	39	5	−142	23
	1975	324	9	272	38	5	−106	20
	1976	328	9	275	39	5	−104	18
AMERICA, SOUTH	1970	72	5	52	10	7	43	3
	1971	77	5	55	10	7	50	3
	1972	86	5	62	11	8	49	3
	1973	97	4	71	12	9	54	3
	1974	99	5	69	14	11	62	3
	1975	97	5	66	14	12	61	3
	1976	101	5	68	14	13	69	3

Note. Production data are based on the production of coal, lignite, crude petroleum, natural gas, natural gas liquids and hydro and nuclear electricity; where peat used as fuel is important, it is included with coal and lignite. Consumption: data are based on the apparent consumption of coal, lignite, petroleum products, natural gas and hydro and nuclear electricity. Coke, manufactured gas and electricity internationally traded are considered to have been consumed by the importing country. Bunkers supplied to foreign-going ships are excluded from consumption. Where suitable official data were not available, estimates were made by the Statistical Office. Comparison between coal and other sources of energy is based on calorific value; factors for conversion to coal equivalent appear in the appendix.

This table contains no new information from that published in the 1977 Statistical Yearbook. For additional detail see *World Energy Supplies 1973–1978*, Statistical Office of the United Nations. Statistical Papers, Series J. No 22, Individual countries included under the various regions are shown in Table 142.

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[1] For production of coal, lignite, natural gas, natural gas liquids and crude petroleum by countries, see "Mining and Quarrying"; for production of petroleum products and coke, see "Manufacturing"; for production of electricity, see Table 144.

[2] Unrevised data for the years 1950–1969 are available in Statistical Papers, Series J, No. 20.

12. Energie: production, commerce et consommation [1]

Monde et régions

Quantités: millions de tonnes métriques, équivalence en houille. Par habitant: kilogrammes

CONSUMPTION — CONSOMMATION							
Total energy Energie totale		Solid fuels Combustibles solides	Liquid fuels Combustibles liquides	Natural gas Gaz naturel	Hydro, nuclear electricity Electricité (hydro, nucléaire)	Year Année	Monde et régions
Aggregate Ensemble	Per capita Par habitant						
6 782	1 881	2 410	2 914	1 304	154	1970	MONDE [2]
7 051	1 920	2 387	3 099	1 400	165	1971	
7 391	1 977	2 417	3 316	1 481	177	1972	
7 767	2 041	2 478	3 572	1 532	185	1973	
7 816	2 017	2 524	3 524	1 561	207	1974	
7 877	1 996	2 600	3 496	1 560	221	1975	
8 318	2 069	2 696	2 733	1 662	228	1976	
109	309	59	45	2	3	1970	AFRIQUE
121	334	63	52	2	3	1971	
128	344	63	55	5	4	1972	
134	353	67	59	4	4	1973	
142	364	69	63	5	4	1974	
151	376	74	67	5	5	1975	
164	397	77	73	10	5	1976	
2 445	10 852	511	1 044	837	53	1970	AMERIQUE DU NORD
2 489	10 880	479	1 084	869	58	1971	
2 637	11 424	517	1 170	886	64	1972	
2 683	11 534	513	1 226	875	70	1973	
2 621	11 176	517	1 183	841	79	1974	
2 578	10 900	551	1 155	787	85	1975	
2 716	11 395	570	1 244	814	87	1976	
138	1 126	6	93	35	4	1970	AMERIQUE CENTRALE
145	1 148	7	102	32	4	1971	
153	1 183	7	108	34	4	1972	
168	1 259	8	117	38	4	1973	
175	1 277	9	122	39	5	1974	
175	1 234	10	122	39	5	1975	
185	1 265	10	130	39	5	1976	
110	702	8	86	10	7	1970	AMERIQUE DU SUD
119	742	8	94	10	7	1971	
126	767	7	100	11	8	1972	
137	815	8	108	12	9	1973	
145	840	8	112	13	11	1974	
149	837	9	114	14	12	1975	
158	868	10	120	15	13	1976	

Remarque. Les données de la production se rapportent à la production de houille, lignite, pétrole brut, gaz naturel et énergie hydro et nucléaire électrique; quand la production de tourbe, utilisée comme combustible, est importante, les données sont comprises avec le charbon et le lignite. Celles de la consommation sont fondées sur la consommation apparente de houille, lignite, produits pétroliers, gaz naturel, condensats provenant du gaz naturel et énergie hydro et nucléaire électrique. Les quantités de coke, de gaz d'usine et d'électricité qui sont passées dans le commerce international sont comptées comme ayant été consommées par le pays importateur. Les combustibles de soute fournis aux navires allant vers l'étranger sont exclus de la consommation. A défaut de données officielles appropriées, des estimations du Bureau de statistique ont été employées. Les comparaisons entre la houille et les autres sources d'énergie sont fondées sur le pouvoir calorifique; les facteurs de conversion en équivalent charbon sont données à l'annexe. Ce tableau est publié sans information supplémentaire par rapport à l'édition 1977 de l'Annuaire statistique. Pour plus de détails, voir *Ressources mondiales en énergie 1973–1978*. Bureau de statistique des Nations Unies, Etudes statistiques, Série J, No. 22. Les pays faisant partie des diverses régions se trouvent au tableau 142.

[1] Pour la production de houille, lignite, gaz naturel condensats provenant du gaz naturel et pétrole brut par pays, voir "Industries extractives"; pour les produits pétroliers et coke voir "Industries manufacturières"; pour l'électricité, voir tableau 144.

[2] Les données non revisées, pour les années 1950–1969 sont disponibles dans les Etudes statistiques, Série J, No. 20.

12. Energy: production, trade and consumption (continued)

World and regions

Quantities: million metric tons of coal equivalent. Per capita: kilograms

World and regions	Year Année	PRODUCTION OF PRIMARY COMMERCIAL ENERGY / PRODUCTION DE L'ENERGIE PRIMAIRE COMMERCIALE: Total primary energy Énergie primaire totale	Coal and lignite Houille et lignite	Crude pet. and nat. gas liquids Pétrole brut et cond. prov. du gaz nat.	Natural gas Gaz naturel	Hydro and nuclear electricity Electricité (hydro et nucléaire)	NET IMPORTS IMPORTATIONS NETTES: Total energy Énergie totale	BUNKERS COMBUSTIBLES DE SOUTE: Total energy Énergie totale
ASIAN MIDDLE EAST	1970	1 064	7	1 028	28	1	−929	38
	1971	1 246	7	1 204	35	1	−1 099	40
	1972	1 387	7	1 339	40	1	−1 233	43
	1973	1 621	8	1 566	47	1	−1 441	43
	1974	1 674	8	1 612	52	1	−1 482	41
	1975	1 512	8	1 450	53	1	−1 326	29
	1976	1 688	8	1 624	54	2	−1 485	30
ASIA, EXCEPT MIDDLE EAST	1970	251	133	87	15	16	378	40
	1971	251	125	94	15	17	404	41
	1972	272	122	113	18	18	426	44
	1973	293	120	135	22	16	471	51
	1974	303	125	133	26	20	470	56
	1975	319	138	130	29	21	445	56
	1976	351	142	152	34	23	450	49
EUROPE, EXCEPT EASTERN EUROPE	1970	557	381	29	99	47	960	74
	1971	583	379	28	128	48	996	76
	1972	583	340	30	161	52	1 044	83
	1973	607	340	30	184	53	1 116	85
	1974	613	316	31	208	58	1 092	74
	1975	653	333	43	216	62	967	72
	1976	680	330	65	226	60	1 049	72
OCEANIA	1970	73	55	13	2	3	16	6
	1971	83	53	24	3	3	5	7
	1972	97	64	25	4	3	2	7
	1973	105	66	30	6	3	−4	8
	1974	109	69	30	6	4	−3	7
	1975	115	72	32	7	4	−6	7
	1976	126	80	33	9	4	−8	7
CENTRALLY PLANNED ECONOMIES [1]	1970	2 071	1 187	584	277	22	−93	4
	1971	2 201	1 234	639	304	23	−90	4
	1972	2 283	1 258	684	318	23	−78	5
	1973	2 404	1 301	739	340	24	−80	5
	1974	2 535	1 334	804	371	26	−109	5
	1975	2 687	1 384	867	410	27	−125	6
	1976	2 832	1 424	925	454	29	−152	6

See general note to this table.

[1] Eastern Europe, China, Mongolia, Democratic People's Republic of Korea, Viet Nam and USSR.

12. Energie: production, commerce et consommation (suite)

Monde et régions

Quantités: millions de tonnes métriques, équivalence en houille. Par habitant: kilogrammes

CONSUMPTION — CONSOMMATION							
Total energy Energie totale		Solid fuels Combustibles solides	Liquid fuels Combustibles liquides	Natural gas Gaz naturel	Hydro, nuclear electricity Electricité (hydro, nucléaire)	Year Année	Monde et régions
Aggregate Ensemble	Per capita Par habitant						
81	776	7	47	27	1	1970	MOYEN-ORIENT D'ASIE
88	821	7	54	27	1	1971	
97	875	7	59	29	1	1972	
111	977	8	67	35	1	1973	
122	1 049	8	73	40	1	1974	
132	1 101	8	83	40	1	1975	
144	1 169	9	92	42	2	1976	
546	492	179	338	13	16	1970	ASIE, A L'EXCLUSION DU MOYEN-ORIENT
576	508	172	373	14	17	1971	
603	521	171	398	16	18	1972	
667	564	181	450	20	16	1973	
670	554	191	435	24	20	1974	
672	544	197	426	28	21	1975	
704	557	200	449	32	23	1976	
1 368	3 862	448	771	101	47	1970	EUROPE, A L'EXCLUSION DE L'EUROPE ORIENTALE
1 399	3 925	416	804	131	48	1971	
1 455	4 051	379	855	168	52	1972	
1 547	4 281	392	909	193	54	1973	
1 520	4 181	388	853	220	58	1974	
1 471	4 025	368	807	234	62	1975	
1 573	4 289	394	868	251	60	1976	
78	4 031	35	38	2	3	1970	OCEANIE
82	4 144	35	41	3	3	1971	
86	4 272	36	42	4	3	1972	
92	4 524	37	46	6	3	1973	
98	4 739	40	48	6	4	1974	
99	4 684	40	47	7	4	1975	
106	4 953	44	49	9	4	1976	
1 907	1 641	1 156	451	278	22	1970	PAYS A ECONOMIE PLANIFIEE [1]
2 032	1 724	1 202	496	311	23	1971	
2 107	1 761	1 227	529	327	24	1972	
2 227	1 838	1 265	590	349	24	1973	
2 322	1 889	1 292	632	372	26	1974	
2 452	1 965	1 343	675	407	26	1975	
2 570	2 030	1 383	708	450	29	1976	

Voir remarque générale concernant ce tableau.

[1] La Chine, la Mongolie, la République populaire démocratique de Corée, le Viet Nam, l'Europe orientale, et l'URSS.

142. Energy: production and consumption[1] — Energie: production et consommation[1]

Quantities in million metric tons of coal equivalent and in kilograms per capita.
Quantités en millions de tonnes métriques, équivalent en houille et en kilogrammes par habitant.

World, region, country or area Monde, région, pays ou zone	Production				Consumption — Consommation					
	Total — Totale				Total — Totale				Per capita Par habitant	
	1973	1974	1975	1976	1973	1974	1975	1976	1973	1976
WORLD — MONDE	**8 447.67**	**8 536.82**	**8 482.35**	**8 951.06**	**7 766.92**	**7 815.94**	**7 877.26**	**8 318.39**	**2 041**	**2 069**
AFRICA — AFRIQUE	*510.54*	*481.59*	*460.95*	*536.69*	*134.37*	*142.01*	*150.84*	*164.06*	*353*	*397*
Algeria — Algérie	83.18	79.23	81.86	91.62	7.47	8.25	7.97	12.61	474	729
Angola	12.17	12.75	11.73	6.75	1.32	1.25	1.18	1.08	218	166
Benin — Bénin	—	—	—	—	0.19	0.21	0.23	0.12	65	49
Burundi	0.01	0.01	0.01	0.01	0.03	0.04	0.03	0.04	9	11
Cape Verde — Cap-Vert	—	—	—	—	0.03	0.03	0.04	0.04	98	122
Central African Empire Empire centrafricain	0.01	0.01	0.01	0.01	0.09	0.06	0.06	0.07	53	41
Chad — Tchad	—	—	—	—	0.08	0.08	0.09	0.09	20	23
Comoros — Comores	—	—	—	—	0.01	0.01	0.02	0.02	49	59
Congo	3.10	3.64	2.66	3.00	0.20	0.21	0.20	0.20	155	142
Djibouti	—	—	—	—	0.08	0.07	0.07	0.08	823	727
Egypt — Egypte	13.21	12.27	19.65	27.26	10.48	12.43	15.76	18.00	294	473
Equatorial Guinea — Guinée équatoriale	—	—	—	—	0.03	0.03	0.03	0.03	84	94
Ethiopia — Ethiopie	0.04	0.04	0.04	0.04	0.91	0.98	0.78	0.76	34	27
Gabon	11.22	15.06	16.79	16.69	0.57	0.58	0.64	0.68	1 099	1 279
Gambia — Gambie	—	—	—	—	0.03	0.03	0.05	0.05	60	84
Ghana	0.48	0.50	0.49	0.51	1.53	1.76	1.67	1.62	163	157
Guinea — Guinée	0.01	0.01	0.01	0.01	0.39	0.41	0.41	0.42	92	93
Guinea-Bissau — Guinée-Bissau	—	—	—	—	0.05	0.04	0.04	0.03	94	58
Ivory Coast — Côte d'Ivoire	0.02	0.03	0.05	0.05	1.68	1.76	1.80	1.91	361	380
Kenya	0.05	0.06	0.08	0.09	1.73	2.07	2.10	2.10	138	152
Liberia — Libéria	0.04	0.04	0.04	0.04	0.66	0.77	0.69	0.72	405	418
Libyan Arab Jam. — Jam. arabe libyenne	160.60	113.94	112.35	145.58	2.00	2.31	2.68	4.04	889	1 589
Madagascar	0.02	0.02	0.02	0.02	0.55	0.51	0.56	0.55	72	66
Malawi	0.02	0.03	0.03	0.04	0.26	0.25	0.26	0.29	53	56
Mali	0.01	0.01	0.01	0.01	0.13	0.15	0.16	0.16	25	27
Mauritania — Mauritanie	—	—	—	—	0.15	0.14	0.14	0.15	119	102
Mauritius — Maurice	0.01	0.01	0.01	0.01	0.19	0.21	0.29	0.35	231	405
Morocco — Maroc	0.87	0.86	0.91	0.95	4.00	4.28	4.60	4.86	244	273
Mozambique	0.42	0.46	0.61	0.56	1.34	1.28	1.16	1.25	152	133
Niger	—	—	—	—	0.15	0.14	0.16	0.14	34	35
Nigeria — Nigéria	150.55	165.10	131.07	153.58	4.85	5.69	5.41	6.09	81	94
Réunion	0.02	0.02	0.01	0.02	0.18	0.20	0.22	0.34	384	674
Rwanda	0.02	0.02	0.02	0.02	0.05	0.05	0.07	0.07	13	17
Sao Tome and Principe Sao Tomé et Principe	—	—	—	—	0.01	0.01	0.01	0.01	105	139
Senegal — Sénégal	—	—	—	—	0.65	0.71	0.76	0.79	169	156
Seychelles	—	—	—	—	0.02	0.03	0.03	0.03	436	570
Sierra Leone	—	—	—	—	0.30	0.34	0.31	0.32	114	112
Somalia — Somalie	—	—	—	—	0.11	0.13	0.15	0.15	38	47
South Africa[2] — Afrique du Sud[2]	62.64	65.31	69.79	76.32	75.57	78.34	84.23	87.40	2 773	2 985
Southern Rhodesia — Rhodésie du Sud	3.75	3.44	3.15	3.42	4.22	4.11	3.81	4.14	714	634
Sudan — Soudan	0.03	0.03	0.04	0.05	2.83	2.74	2.62	2.59	167	143
Togo	—	—	—	—	0.17	0.16	0.15	0.19	78	85
Tunisia — Tunisie	5.90	6.41	7.12	5.80	2.16	2.39	2.49	2.61	396	456
Uganda — Ouganda	0.10	0.10	0.10	0.11	0.65	0.66	0.63	0.58	61	48
United Republic of Cameroon République-Unie du Cameroun	0.13	0.14	0.16	0.16	0.54	0.55	0.68	0.64	87	98
United Republic of Tanzania République-Unie de Tanzanie	0.04	0.04	0.05	0.06	1.36	1.06	1.04	1.07	95	68
Upper Volta — Haute-Volta	—	—	—	—	0.10	0.11	0.12	0.11	17	18
Zaire — Zaïre	0.58	0.51	0.58	2.37	1.80	1.82	1.58	1.58	76	62
Zambia — Zambie	1.31	1.53	1.55	1.62	2.50	2.60	2.69	2.81	539	548

This table contains no new information from that published in the 1977 Statistical Yearbook.

See general note to Table 12.

Ce tableau est publié sans information supplémentaire par rapport à l'édition 1977 de l'Annuaire statistique.

Voir remarque générale au tableau 12.

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[1] For production of coal, lignite, natural gas, natural gas liquids and crude petroleum by countries, see "Mining and Quarrying"; for production of petroleum products and coke, see "Manufacturing"; for production of electricity, see Table 144.

[2] Including data for Botswana, Lesotho, Namibia and Swaziland.

[1] Pour la production de houille, lignite, gaz naturel, condensats provenant du gaz naturel et pétrole brut par pays, voir "Industries extractives"; pour les produits pétroliers et coke voir "Industries manufacturières"; pour l'électricité, voir tableau 144.

[2] Y compris les données du Botswana, Lesotho, Namibie et Souaziland.

3.24

142. Energy: production and consumption (continued) — Energie: production et consommation (suite)

Quantities in million metric tons of coal equivalent and in kilograms per capita.
Quantités en millions de tonnes métriques, équivalent en houille et en kilogrammes par habitant.

Region, country or area Région, pays ou zone	Production				Consumption — Consommation					
	Total — Totale				Total — Totale				Per capita Par habitant	
	1973	1974	1975	1976	1973	1974	1975	1976	1973	1976
AMERICA, NORTH — AMERIQUE DU NORD	*2 431.70*	*2 360.73*	*2 314.38*	*2 308.50*	*2 683.36*	*2 620.63*	*2 577.58*	*2 716.20*	*11 534*	*11 395*
Bermuda — Bermudes	—	—	—	—	0.15	0.18	0.17	0.24	2 686	4 181
Canada	287.01	279.72	265.75	258.80	213.11	218.91	224.25	230.28	9 632	9 950
Greenland — Groenland	—	—	—	—	0.25	0.23	0.21	0.20	5 043	4 078
St. Pierre, Miquelon	—	—	—	—	0.02	0.02	0.02	0.02	3 185	4 722
United States — Etats-Unis	2 144.69	2 081.01	2 048.63	2 049.70	2 469.83	2 401.29	2 352.93	2 485.45	11 738	11 554
AMERICA, CENTRAL — AMERIQUE CENTRALE	*378.71*	*361.90*	*324.03*	*328.46*	*167.99*	*175.43*	*174.63*	*184.51*	*1 259*	*1 265*
Antigua	—	—	—	—	0.23	0.20	0.17	0.17	3 379	2 438
Bahamas	—	—	—	—	1.42	1.31	1.48	1.54	7 464	7 286
Barbados — Barbade	0.01	0.01	0.03	0.04	0.23	0.22	0.25	0.24	953	974
Belize	—	—	—	—	0.07	0.07	0.08	0.09	528	602
Br. Virgin Is. — Iles Vierges brittaniques	—	—	—	—	0.01	0.01	0.01	0.01	1 233	1 027
Coyman Islands — Iles Caimanes	—	—	—	—	0.03	0.03	0.03	0.04	2 402	2 558
Colombia — Colombie	21.00	20.05	19.49	18.73	14.89	15.55	15.84	16.66	666	685
Costa Rica	0.14	0.15	0.16	0.18	1.03	1.00	1.03	1.02	552	448
Cuba	0.23	0.28	0.26	0.25	10.49	10.62	11.15	11.60	1 162	1 225
Dominica — Dominique	—	—	—	—	0.01	0.02	0.02	0.02	190	207
Dominican Rep. — Rép. Dominicaine	0.01	0.02	0.02	0.02	2.86	3.09	3.29	3.30	645	653
El Salvador	0.05	0.06	0.06	0.09	0.94	0.96	0.98	1.07	249	260
Grenado — Grenade	—	—	—	—	0.03	0.02	0.02	0.02	296	211
Guadeloupe	—	—	—	—	0.21	0.19	0.20	0.25	598	685
Guatemala	0.04	0.04	0.04	0.05	1.38	1.43	1.52	1.61	241	257
Haiti — Haïti	0.01	0.01	0 02	0.02	0.15	0.13	0.14	0.13	33	28
Honduras	0.04	0.05	0.06	0.06	0.69	0.72	0.73	0.75	264	264
Jamaico — Jamaïque	0.01	0.02	0.02	0.02	5.98	3.67	3.97	3.98	2 016	1 937
Martinique	—	—	—	—	0.35	0.36	0.36	0.36	1 009	984
Mexico — Mexique	61.19	72.68	83.78	91.44	65.14	70.96	72.60	76.40	1 160	1 227
Montserrat	—	—	—	—	0.01	0.01	0.01	0.01	776	1 078
Neth. Antilles — Antilles néerl.	—	—	—	—	7.54	6.82	4.93	5.50	32 201	22 836
Nicaragua	0.04	0.05	0.05	0.05	0.94	0.96	0.97	1.07	466	478
Panama	0.01	0.01	0.01	0.01	1.43	1.37	1.52	1.52	908	885
Canal Zone — Zone du Canal	0.03	0.04	0.03	0.04	0.40	0.45	0.58	0.55	9 775	13 685
Puerto Rico — Porto Rico	0.04	0.04	0.04	0.04	12.28	12.88	11.63	11.54	4 161	3 591
St. Kitts-Nevis-Anguilla Saint-Christophe-et-Nièves et Anguilla	—	—	—	—	0.01	0.02	0.02	0.02	216	282
St. Lucio — Sainte-Lucie	—	—	—	—	0.04	0.04	0.04	0.04	374	366
St. Vincent — Saint Vincent	—	—	—	—	0.02	0.02	0.02	0.02	217	200
Trinidad and Tobago Trinité-et-Tobago	15.37	16.39	18.51	18.42	5.34	4.88	4.21	4.66	5 044	4 272
U.S. Virgin Is. — Iles Vierges américaines	—	—	—	—	4.59	4.63	4.77	5.16	55 928	54 283
Venezuela	280.49	252.00	201.46	199.00	31.27	32.80	32.06	35.08	2 772	2 838
AMERICA, SOUTH — AMERIQUE DU SUD	*97.28*	*98.55*	*96.78*	*100.59*	*137.39*	*145.18*	*148.59*	*157.72*	*815*	*868*
Argentina — Argentine	41.05	41.54	41.59	41.82	46.07	45.60	44.74	46.40	1 864	1 804
Bolivia — Bolivie	5.28	5.26	4.94	5.04	1.26	1.49	1.68	1.84	236	318
Brazil — Brésil	22.22	24.89	25.08	26.47	61.80	69.31	73.32	79.84	615	731
Chile — Chili	6.27	6.20	6.01	5.73	11.64	11.55	10.00	10.32	1 176	987
Ecuador — Equateur	15.71	13.38	12.13	14.10	2.14	2.58	2.95	3.33	319	455
Falkland Islands — Iles Falkland (Malvinas)	—	—	—	—	0.01	0.01	0.01	0.01	3 500	3 750
French Guiana — Guyane française	—	—	—	—	0.06	0.05	0.06	0.13	1 071	2 155
Guyana — Guyane	—	—	—	—	0.87	0.75	0.88	0.84	1 153	1 072
Paraguay	0 04	0.05	0.07	0.08	0.41	0.44	0.42	0.52	164	189
Peru — Pérou	6.39	6.94	6.70	7.06	9.04	9.76	10.57	10.34	615	642
Suriname	0.12	0.12	0.13	0.15	1.12	0.89	1.09	1.05	2 795	2 406
Uruguay	0.19	0.17	0.14	0.15	2.96	2.76	2.89	3.10	991	1 000

See general note to Table 12.

Voir remarque générale ou tableou 12.

3 760

142. Energy: production and consumption (continued) — Energie: production et consommation (suite)

Quantities in million metric tons of coal equivalent and in kilograms per capita.
Quantités en millions de tonnes métriques, équivalent en houille et en kilogrammes par habitant.

Region, country or area Région, pays ou zone	Production				Consumption — Consommation					
	Total — Totale				Total — Totale				Per capita Par habitant	
	1973	1974	1975	1976	1973	1974	1975	1976	1973	1976
ASIAN MIDDLE EAST MOYEN-ORIENT D'ASIE	*1 621.01*	*1 673.55*	*1 511.83*	*1 688.49*	*110.83*	*122.43*	*132.03*	*143.68*	*977*	*1 169*
Bahrain — Bahrein	7.15	7.57	7.25	7.17	2.29	2.79	2.99	3.18	10 077	11 998
Cyprus — Chypre	—	—	—	—	1.14	0.86	0.85	0.96	1 836	1 500
Iran	461.10	476.25	426.22	467.36	36.11	41.30	44.49	49.77	1 154	1 490
Iraq — Irak	147.94	143.93	165.62	167.70	7.24	7.34	7.83	8.36	695	725
Israel — Israël	[4] 8.53	[4] 7.18	[4] 7.51	0.13	9.48	9.39	9.46	9.01	2 952	2 541
Jordan — Jordanie	—	—	—	—	0.89	1.00	1.10	1.46	349	527
Kuwait [2] — Koweït [2]	235.13	199.30	164.30	169.10	8.20	8.45	8.51	9.47	9 256	9 198
Lebanon — Liban	0.06	0.10	0.10	0.10	2.91	2.99	2.66	1.58	1 079	533
Oman	21.51	21.27	25.01	26.89	0.15	0.23	0.36	0.55	202	696
Qatar	42.53	38.04	34.35	37.71	2.29	2.00	3.25	2.40	26 613	25 236
Saudi Arabia [1] — Arabie Saoudite [1]	566.71	637.15	533.27	643.99	10.75	14.34	15.45	17.56	1 272	1 901
Syrian Arab Rep. — Rép. arabe syrienne	8.16	9.46	14.08	14.94	3.00	4.13	5.16	5.65	435	744
Turkey — Turquie	12.02	12.33	12.43	12.20	23.67	24.53	26.43	29.83	634	743
United Arab Emirates Emirats arabes unis	110.20	120.96	121.68	141.21	1.81	2.31	2.66	3.05	8 679	13 322
Yemen — Yémen	—	—	—	—	0.16	0.17	0.26	0.28	26	41
Yemen, Democratic — Yémen démocratique	—	—	—	—	0.75	0.59	0.56	0.57	485	324
ASIA, EXCEPT MIDDLE EAST[3] ASIE A L'EXCLUSION DU MOYEN-ORIENT[3]	*292.57*	*303.40*	*319.13*	*350.54*	*666.81*	*670.07*	*671.97*	*703.66*	*564*	*557*
Afghanistan	3.91	4.11	4.17	3.62	0.78	0.76	0.88	0.81	43	41
Bangladesh	0.96	1.01	0.69	1.14	2.35	2.19	2.18	2.63	32	32
Brunei — Brunéi	19.71	20.26	22.34	25.96	1.61	2.24	2.29	2.52	11 096	14 200
Burma — Birmanie	1.53	1.51	1.51	1.78	1.36	1.58	1.39	1.51	47	49
Dem. Kampuchea — Kampuchea dém.	—	—	—	—	0.23	0.13	0.13	0.13	30	16
East Timor — Timor oriental	—	—	—	—	0.01	0.01	0.01	0.01	17	16
Hong Kong — Hong-kong	—	—	—	—	6.06	6.32	5.24	5.75	1 456	1 313
India — Inde	94.23	100.75	114.62	121.09	112.41	116.67	127.56	132.92	196	218
Indonesia — Indonésie	99.83	101.10	97.79	113.84	17.57	19.98	25.05	30.43	136	218
Japan — Japon	37.49	38.19	37.44	38.21	425.84	421.52	403.72	414.87	3 918	3 679
Korea, Rep. of — Corée, Rép. de	13.73	15.52	17.79	16.65	31.20	31.98	35.23	36.58	915	1 020
Lao People's Dem. Rep. Rép. dém. populaire lao	0.03	0.03	0.03	0.03	0.26	0.21	0.21	0.21	83	61
Macau — Macao	—	—	—	—	0.07	0.08	0.12	0.11	258	381
Malaysia — Malaisie:										
Peninsular — Péninsulaire	0.14	0.14	0.14	0.14	5.19	5.49	5.52	6.01	546	578
Sabah	—	0.04	0.70	3.59	0.41	0.46	0.48	0.55	547	678
Sarawak	6.50	5.76	6.29	8.33	1.81	1.58	1.05	1.07	1 720	972
Nepal — Népal	0.01	0.01	0.02	0.02	0.15	0.14	0.14	0.14	12	11
Pakistan	7.91	8.21	8.41	8.33	12.26	12.86	13.15	13.11	185	181
Philippines	0.48	0.58	0.66	0.76	12.48	12.39	13.08	14.38	311	329
Singapore — Singapour	—	—	—	—	4.38	4.09	5.10	5.15	2 006	2 262
Sri Lanka	0.09	0.14	0.14	0.14	1.75	1.60	1.60	1.45	134	106
Thailand — Thaïlande	0.36	0.47	0.58	0.68	11.49	11.22	11.89	13.22	290	308

See general note to Table 12.

[1] Data include Saudi Arabia's share of production and consumption in the Neutral Zone.

[2] Data include Kuwait's share of production and consumption in the Neutral Zone.

[3] Excluding China, Democratic People's Republic of Korea, Mongolia and Viet Nam.

[4] Including estimates of crude petroleum production in the Sinai Peninsula.

Voir remarque générale au tableau 12.

[1] Les données comprennent la part de l'Arabie Saoudite dans la production et la consommation de la Zone neutre.

[2] Les données comprennent la part de Koweït dans la production et la consommation de la Zone neutre.

[3] Non compris la Chine, la République populaire démocratique de Corée, la Mongolie et le Viet Nam.

[4] Y compris les estimations de la production de pétrole brut dans la péninsule du Sinaï.

142. Energy: production and consumption (continued) — Energie: production et consommation (suite)

Quantities in million metric tons of coal equivalent and in kilograms per capita.
Quantités en millions de tonnes métriques, équivalent en houille et en kilogrammes par habitant.

Region, country or area Région, pays ou zone	Production				Consumption — Consommation					
	Total — Totale				Total — Totale				Per capita Par habitant	
	1973	1974	1975	1976	1973	1974	1975	1976	1973	1976
EUROPE, EXCEPT EASTERN EUROPE EUROPE, A L'EXCLUSION L'EUROPE ORIENT.	*607.19*	*612.68*	*653.27*	*680.13*	*1 546.87*	*1 519.94*	*1 470.91*	*1 572.98*	*4 281*	*4 289*
Austria — Autriche	11.09	10.94	10.91	9.96	30.28	29.32	28.07	30.15	4 024	4 013
Belgium — Belgique	9.00	8.29	8.67	8.81	62.29	61.14	56.24	59.82	6 394	6 049
Denmark — Danemark	0.10	0.13	0.22	0.29	27.35	24.76	25.26	26.99	5 446	5 320
Faeroe Islands — Iles Féroé	0.01	0 01	0.01	0.01	0.13	0.15	0.18	0.17	3 355	4 134
Finland [1] — Finlande [1]	1.35	1.57	1.70	1.41	22.99	22.90	22.01	24.47	4 928	5 177
France	48.77	47.31	47.61	45.10	233.75	228.80	208.40	231.92	4 480	4 380
Germany, Fed. R. — Allemagne, R. féd.	170.28	170.54	165.87	165.88	364.69	357.59	330.49	364.28	5 885	5 922
Gilbraltar	—	—	—	—	0.02	0.02	0.02	0.02	715	661
Greece — Grèce	4.75	5.04	6.32	7.68	16.38	17.13	18.13	20.62	1 834	2 250
Iceland — Islande	0.27	0.28	0.27	0.29	1.10	1.11	1.03	1.00	5 192	4 556
Ireland [1] — Irlande [1]	1.93	2.07	2.33	2.41	9.96	9.73	9.53	10.02	3 266	3 170
Italy — Italie	27.65	27.63	27.15	28.43	168.78	170.26	170.92	184.46	3 074	3 284
Luxembourg	0.10	0.11	0.06	0.06	6.40	6.59	5.53	5.56	18 245	15 788
Malta — Malte	—	—	—	—	0.40	0.37	0.30	0.33	1 229	1 070
Netherlands — Pays-Bas	89.52	104.75	111.81	118.06	80.13	78.87	81.96	85.70	5 963	6 224
Norway — Norvège	11.71	12.39	23.82	31.41	20.15	19.28	20.46	21.19	5 087	5 263
Portugal	1.13	1.20	1.01	0.79	8.99	9.26	9.35	10.13	1 050	1 050
Spain — Espagne	17.05	19.50	19.59	19.00	68.82	73.83	76.08	86.31	1 974	2 399
Sweden — Suède	7.64	7.31	8.58	8.73	48.54	45.20	46.17	49.71	5 965	6 046
Switzerland — Suisse	4.27	4.34	5.09	4.21	24.99	22.37	22.34	21.30	3 874	3 340
United Kingdom — Royaume-Uni	175.00	162.25	184.02	198.18	313.86	301.01	297.24	295.28	5 599	5 268
Yugoslavia — Yougoslavie	25.58	27.04	28.22	29.42	36.86	40.24	41.22	43.46	1 759	2 016
OCEANIA — OCEANIE	*104.75*	*108.98*	*114.99*	*125.95*	*91.82*	*98.02*	*98.58*	*105.73*	*4 524*	*4 953*
American Samoa — Samoa américain	—	—	—	—	0.02	0.07	0.05	0.05	835	1 727
Australia — Australie	100.17	104.24	110.04	119.86	77.95	83.09	84.38	90.83	5 936	6 657
Christmas Island — Ile Christmas	—	—	—	—	0.04	0.06	0.07	0.06	11 537	20 537
Fiji — Fidji	—	—	—	—	0.24	0.31	0.29	0.23	432	403
Fr. Polynesia — Polynésie fr.	—	—	—	—	0.11	0.14	0.12	0.12	924	920
Gilbert Islands — Iles Gilbert	—	—	—	—	0.02	0.02	0.02	0.02	289	335
Guam	—	—	—	—	1.17	1.22	1.27	0.85	11 832	9 081
Nauru	—	—	—	—	0.04	0.05	0.05	0.05	5 817	6 430
New Caledonia — Nouvelle-Calédonie	0.03	0.03	0.04	0.05	1.25	1.33	1.23	1.04	9 648	7 687
New Hebrides — Nouvelles-Hébrides	—	—	—	—	0.06	0.06	0.06	0.06	608	567
New Zealand — Nouvelle-Zélande	4.53	4.69	4.89	6.00	10.03	10.68	10.05	11.35	3 397	3 617
Pacific Is. — Iles du Pacifique	—	—	—	—	0.08	0.09	0.09	0.09	764	745
Papua New Guinea Papauasie-Nouvelle-Guinée	0.02	0.02	0.02	0.03	0.69	0.80	0.76	0.82	267	289
Samoa	—	—	—	—	0.02	0.02	0.02	0.02	131	160
Solomon Is. — Iles Salomon	—	—	—	—	0.04	0.04	0.05	0.06	213	290
Wake Island — Ile de Wake	—	—	—	—	0.05	0.05	0.05	0.05	24 235	24 025
CENTRALLY PLANNED ECONOMIES PAYS A ECONOMIE PLANIFIEE	*2 403.93*	*2 535.44*	*2 686.99*	*2 831.27*	*2 227.49*	*2 322.24*	*2 452.13*	*2 569.85*	*1 838*	*2 030*
Albania — Albanie	3.83	4.01	4.20	4.55	1.67	1.72	1.83	2.21	710	867
Bulgaria — Bulgarie	14.44	13.10	15.02	14.08	36.76	37.45	40.94	41.26	4 264	4 710
China * — Chine *	513.35	553.85	589.46	614.78	503.76	537.59	564.00	590.06	633	706
Czechoslovakia — Tchécoslovaquie	78.18	79.22	81.78	83.84	99.66	101.41	106.06	110.34	6 845	7 397
German Dem. Rep. — Rép. dém. allemande	78.05	78.91	78.37	79.25	106.51	109.33	111.05	113.96	6 273	6 789
Hungary — Hongrie	21.22	21.09	20.86	22.21	33.05	34.29	35.56	37.66	3 169	3 553
Korea, Dem. P.R. * — Corée, R.p. dém. *	35.86	39.46	42.43	48.10	37.14	40.87	44.27	49.90	2 470	3 072
Mongolia — Mongolie	0.85	0.91	1.01	1.10	1.32	1.47	1.58	1.74	973	1 166
Poland — Pologne	175.95	181.61	191.90	200.35	151.89	156.26	169.80	180.51	4 553	5 253
Romania — Roumanie	74.24	76.53	80.41	83.90	74.29	74.70	80.72	86.56	3 567	4 036
USSR [1] — URSS [1]	1 401.92	1 482.70	1 577.26	1 674.10	1 169.93	1 218.86	1 287.92	1 349.86	4 684	5 259
Viet Nam	3.04	4.05	4.30	5.07	11.51	8.31	8.41	5.78	270	124

See general note to Table 12.

[1] Including peat.

Voir remarque générale au tableau 12.

[1] Y compris la tourbe.

Conversion coefficients and factors (continued) — Coefficients et facteurs de conversion (suite)

C. Other coefficients or conversion factors employed in *Statistical Yearbook* tables (continued)
Autres coefficients ou facteurs de conversion utilisés dans les tableaux de l'*Annuaire statistique* (suite)

Sulphuric acid, hydrochloric acid and nitric acid

Sulphuric acid production reported by countries at 66° Baumé is published without adjustment. The production of all other countries is converted to 100% H_2SO_4 according to the percentages given in the following table:

Acide sulfurique, acide chlorhydrique et acide nitrique

La production d'acide sulfurique indiquée pour les pays à 66° Baumé est publiée sans ajustements. La production de tous les autres pays est convertie en SO_4H_2 suivant les pourcentages donnés dans le tableau suivant:

Sulphuric acid — Acide sulfurique	
°Bé	%H_2SO_4
50.3	63
53.0	67
55.0	70
60.5	79
65.1	90
65.5	92

Hydrochloric acid — Acide chlorhydrique	
°Bé	%HCl
18	28.5
20	32.2
21	34.0
22	36.0
23	38.0
24	40.0

Nitric acid — Acide nitrique	
°Bé	%HNO_3
34.3	50
38.9	60
42.4	70
45.1	80
47.2	90
49.2	100

Sulphur trioxide (SO_3) has been converted into H_2SO_4 by the addition of 22.5%, representing the proportion of water in the acid (81.6% SO_3 and 18.4% H_2O), that is, applying a coefficient of 122.5% to the original figure of SO_3. Oleum or "fuming" at 20% is converted at 105% H_2SO_4.

Le trioxide sulfurique (SO_3) a été converti en SO_4H_2 en ajoutant 22.5% représentant la proportion de l'eau dans l'acide (81.6% SO_3 et 18.4% H_2O), c'est-à-dire en appliquant un coefficient de 122.5% au chiffre original de SO_3. L'oléum ou "fuming" à 20% est converti à 105% SO_4H_2.

SELECTED ENERGY CONVERSION FACTORS — FACTEURS DE CONVERSION POUR CERTAINS PRODUITS EN MATIERE D'ENERGIE

Crude petroleum

1 barrel = 42 U.S. gallons = 34.97 imperial gallons = 158.99 litres = 0.15899 cubic metres.

1 cubic metre = 6.2898 barrels.

The equivalent of barrels in metric tons depends on the specific gravity of the petroleum which varies from country to country. The average specific gravity for each producing country is indicated in the *Yearbook* table on the production of crude petroleum.

Natural Gas and Manufactured Gas (Gasworks Gas and Cokeries Gas)

Data for all gases are presented on a teracalorie basis in order to more accurately reflect their heating value. To provide a method of comparison with earlier editions, a column of average gross conversion factors from kilocalories to cubic metres for the most recent year is indicated in the respective *Yearbook* tables.

Petroleum products

The following approximate coefficients have been used to convert original data, expressed in capacity or volume, into metric tons:

Pétrole brut

1 baril = 42 gallons E.-U. = 34.97 gallons britanniques = 158.99 litres = 0.15899 m^3.

1 m^3 = 6.2898 barils.

L'équivalent du baril en tonnes métriques dépend du poids spécifique du pétrole qui varie d'un pays à l'autre. Le poids spécifique moyen utilisé pour chaque pays producteur se trouve dans l'*Annuaire* au tableau relatif à la production de pétrole brut.

Gaz naturel et gaz manufacturé (Gaz d'usines et de cokeries)

Les données pour tous les gaz sont présentées en teracalories afin de rendre compte avec plus d'exactitude de leur pouvoir calorifique. Pour permettre la comparaison avec les éditions antérieures, les tableaux respectifs de l'*Annuaire* comportent une colonne ou sont indiqués les facteurs bruts moyens de conversion des kilocalories en mètres cubes pour l'année la plus récente.

Dérivés du pétrole

Les coefficients suivants approximatifs ont été utilisés pour convertir en tonnes métriques les données de base, exprimées en capacité ou en volume:

Product	Kilolitres = m^3	000 gallons imperial britanniques	000 gallons U.S.—E.-U.	U. S. barrels Barils E.-U.	Produit
Liquefied petroleum gas	0.54	2.4549	2.0441	0.08585	Gaz de pétrole liquéfié
Naphtha	0.72	3.2731	2.7255	0.1145	Naphte
Motor spirit	0.74	3.3641	2.8012	0.1177	Essence
Aviation spirit	0.73	3.3186	2.7633	0.1161	Essence pour aviation
Kerosene, White spirit and jet fuel	0.81	3.6823	3.0662	0.1288	Pétrole lampant, white-spirit et carburéacteur
Distillate fuel oils	0.87	3.9551	3.2933	0.1383	Huiles légères
Residual fuel oils	0.95	4.3188	3.5961	0.1510	Huiles lourdes
Lubricating oils	0.90	4.0915	3.4069	0.1431	Huiles de graissage
Bitumen (asphalt)	1.04	4.7279	3.9368	0.1653	Bitume (asphalte)
Paraffin wax	0.80	3.6369	3.0283	0.1272	Paraffine
Road oil	0.97	4.4097	3.6718	0.1542	Bitumes fluxés
Petroleum coke	1.14	5.1825	4.3154	0.1812	Coke de pétrole
Natural gasoline	0.63	2.8640	2.3848	0.1002	Gazoline naturelle
Plant condensates	0.70	3.1822	2.6498	0.1113	Le condensat de raffinerie
Fuel oils n.o.s.	0.91	4.1369	3.4447	0.1447	Huiles légères et lourdes non spécifiées

Conversion coefficients and factors (continued) — Coefficients et facteurs de conversion (suite)

C. Other coefficients or conversion factors employed in *Statistical Yearbook* tables (continued)

Autres coefficients ou facteurs de conversion utilisés dans les tableaux de l'*Annuaire statistique* (suite)

SELECTED ENERGY CONVERSION FACTORS (continued) — FACTEURS DE CONVERSION POUR CERTAINS PRODUITS EN MATIERE D'ENERGIE (suite)

Coal equivalent [2] (metric tons unless otherwise indicated):

Coal, anthracite and bituminous	1.0
Coal briquettes	1.0
Cokes of coal	0.9
Brown coal and lignite:	
New Zealand	0.67
Czechoslovakia, France, Dem. People's Rep. of Korea	0.6
Albania, Austria, Bulgaria, Hungary, Portugal, Spain, USSR, Yugoslavia	0.5
Other countries	0.3–0.36
Cokes of brown coal or lignite	0.67
Briquettes of brown coal and lignite	0.67
Peat for fuel	0.3–0.5
Peat briquettes	0.5
Crude petroleum	1.47
Natural gas liquids (weighted average)	1.67
Liquefied petroleum gases	1.68
Natural gasolene	1.66
Condensate and other	1.64
Motor spirit	1.61
Kerosene and jet fuel	1.59
Fuel oils	1.50
Natural gas (teracalorie [1])	142.9
Manufactured gas (teracalorie [1])	142.9

Coal equivalent (metric tons) of hydro, nuclear and geothermal electricity:
1000 kWh = 0.123

Equivalent en houille [2] (tonnes métriques sauf indication contraire):

Charbon, anthracite et la houille bitumineuse	1.0
Briquettes de charbon	1.0
Cokes de charbon brun ou de lignite	0.67
Charbon brun et lignite:	
Nouvelle-Zélande	0.67
France, Tchécoslovaquie, Rép. pop. dém. de Corée	0.6
Albanie Autriche, Bulgarie, Espagne, Hongrie, Portugal, URSS, Yougoslavie	0.5
Autres pays	0.3–0.36
Cokes de charbon brun ou de lignite	0.67
Briquettes de charbon brun et de lignite	0.67
Tourbe pour combustible	0.3–0.5
Briquettes de tourbe	0.5
Pétrole brut	1.47
Condensats provenant du gaz naturel (moyenne pondérée)	1.67
Gaz de pétrole liquéfié	1.68
Gazoline naturelle	1.66
Condensat et autres	1.64
Essence	1.61
Pétrole lampant et carburéacteur	1.59
Huiles légères	1.50
Gaz naturel (teracalorie [1])	142.9
Gaz d'usine (teracalorie [1])	142.9

Equivalent en houille (tonnes métriques) d'électricité, hydro, nucléaire et géothermique:
1000 kWh = 0.123

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[1] Under standard conditions of 15°C, 1 013.25 mbar, dry.

[2] It should be noted that the base used for coal equivalency comprises 7 000 calories/grammes.

[1] En volume standard (à 15°C, 1 013.25 mbar, gaz sec).

[2] Veuillez noter que l'équivalence en houille est faite sur la base de 7 000 calories/grammes.

(Abstracted from United Nations Statistical Yearbook, 1978)

WORLD SUMMARY

12. Energy: production, trade and consumption

World and regions

Quantities: million metric tons of coal equivalent. Per capita: kilograms

		CONSUMPTION — CONSOMMATION					
World and regions		Total energy Energie totale		World and regions		Total energy Energie totale	
	Year Année	Aggregate Ensemble	Per capita Par habitant		Year Année	Aggregate Ensemble	Per capita Par habitant
WORLD	1970	6 782	1 881	ASIAN MIDDLE EAST..............	1970	81	776
	1971	7 051	1 920		1971	88	821
	1972	7 391	1 977		1972	97	875
	1973	7 767	2 041		1973	111	977
	1974	7 816	2 017		1974	122	1 049
	1975	7 877	1 996		1975	132	1 101
	1976	8 318	2 069		1976	144	1 169
AFRICA.............	1970	109	309	ASIA, EXCEPT MIDDLE EAST..........	1970	546	492
	1971	121	334		1971	576	508
	1972	128	344		1972	603	521
	1973	134	353		1973	667	564
	1974	142	364		1974	670	554
	1975	151	376		1975	672	544
	1976	164	397		1976	704	557
AMERICA, NORTH....	1970	2 445	10 852	EUROPE, EXCEPT EASTERN EUROPE..	1970	1 368	3 862
	1971	2 489	10 880		1971	1 399	3 925
	1972	2 637	11 424		1972	1 455	4 051
	1973	2 683	11 534		1973	1 547	4 281
	1974	2 621	11 176		1974	1 520	4 181
	1975	2 578	10 900		1975	1 471	4 025
	1976	2 716	11 395		1976	1 573	4 289
AMERICA, CENTRAL...	1970	138	1 126	OCEANIA.........................	1970	78	4 031
	1971	145	1 148		1971	82	4 144
	1972	153	1 183		1972	86	4 272
	1973	168	1 259		1973	92	4 524
	1974	175	1 277		1974	98	4 739
	1975	175	1 234		1975	99	4 684
	1976	185	1 265		1976	106	4 953
AMERICA, SOUTH.....	1970	110	702	CENTRALLY PLANNED ECONOMIES [1]..	1970	1 907	1 641
	1971	119	742		1971	2 032	1 724
	1972	126	767		1972	2 107	1 761
	1973	137	815		1973	2 227	1 838
	1974	145	840		1974	2 322	1 889
	1975	149	837		1975	2 452	1 965
	1976	158	868		1976	2 570	2 030

Note: Consumption per capita is given in kilograms of coal equivalent, which in turn is defined as anthracite coal or briquets. High grade anthracite generates 7,500 Gram Calories per Gram, or 13,500 BTU's per Lb.

Note. Production data are based on the production of coal, lignite, crude petroleum, natural gas, natural gas liquids and hydro and nuclear electricity; where peat used as fuel is important, it is included with coal and lignite. Consumption: data are based on the apparent consumption of coal, lignite, petroleum products, natural gas and hydro and nuclear electricity. Coke, manufactured gas and electricity internationally traded are considered to have been consumed by the importing country. Bunkers supplied to foreign-going ships are excluded from consumption. Where suitable official data were not available, estimates were made by the Statistical Office. Comparison between coal and other sources of energy is based on calorific value; factors for conversion to coal equivalent appear in the appendix.

[1] Eastern Europe, China, Mongolia, Democratic People's Republic of Korea, Viet Nam and USSR.

This table contains no new information from that published in the 1977 Statistical Yearbook. For additional detail see *World Energy Supplies* 1973–1978, Statistical Office of the United Nations. Statistical Papers, Series J. No 22, Individual countries included under the various regions are shown in Table 142.

[1] For production of coal, lignite, natural gas, natural gas liquids and crude petroleum by countries, see "Mining and Quarrying"; for production of petroleum products and coke, see "Manufacturing"; for production of electricity, see Table 144.

[2] Unrevised data for the years 1950–1969 are available in Statistical Papers, Series J, No. 20.